

[0122] Fastening member 402 defines a pair of windows 132 each spanned by one of the encircling members. Each window may be open laterally (an open perimeter), as shown here, or may be completely bounded around its perimeter (a closed perimeter) (e.g., see FIGS. 2-5). Windows 132 may be open on opposite lateral sides of fastening member 402.

[0123] Each encircling member is secured at a distinct crimp region 92. An alignment aperture 182 may be shared by both crimp regions. To deform a crimp region, the jaws of a crimping tool may be placed on opposite sides of the crimp region, with one jaw disposed in aperture 182, and the other jaw abutted with a lateral wall region at the perimeter of the fastening member.

[0124] FIG. 31 shows a pair of exemplary binding devices 420 stabilizing cut sternum 52. Each device 420 includes a pair of encircling members 68 secured around a portion of the sternum in a parallel configuration, orthogonal to the long axis of the sternum, with a same fastening member 422. Each encircling member may or may not extend into the sternum. Fastening member 422 defines a U-shaped aperture 294 that functions as both a window for receiving jaws of a cutting tool and an alignment aperture for receiving jaws of a crimping tool (also see FIG. 24).

Example 4

Fastening Member with Perimeter Cutting Windows

[0125] This example describes an exemplary binding device including a fastening member 440 with elongate tabs or protrusions 442 that opposingly flank a pair of perimeter cutting windows 132; see FIGS. 32 and 33. Tabs 442 each may be equipped with a prong 150 formed under and projecting downward from each tab.

[0126] Each tab 442 may be structured as an elongated corner of the fastening member. The tab may project from a body portion 444 that provides crimp region 92. The tab may project along an axis 446 that is parallel or oblique to spanning axis 118 of the fastening member. For example, axis 446 may form a smaller angle with spanning axis 118 than with crimping axis 95. A characteristic dimension of the fastening member and/or of a tab, measured parallel to spanning axis 118 may be at least about twice a characteristic dimension of body portion 444, measured parallel to the same axis.

[0127] FIG. 33 shows fastening member 440 disposed on sternum 52 and securing encircling member 68 to the sternum. Tabs 442 in combination with prongs 150 may elevate a region 448 of the encircling member that extends out of window 132 toward bone. The elevated region of the encircling member may be conveniently positioned in window 132 for cutting the encircling member in a re-entry procedure.

Example 5

Crimping a Fastening Member Using Male and Female Jaws

[0128] This example describes use of an exemplary crimping tool 460 having opposable jaws 462, 464 providing jaw faces that are respectively convex and concave; see FIGS. 34-36.

[0129] FIG. 34 shows an exemplary binding device 470 in an assembled configuration before crimping with tool 460 (see FIGS. 35 and 36). Device 470 includes fastening member 472 and encircling member 68 that spans crimp region 92 twice.

[0130] Crimp region may include a plurality of deformable apertures 134, which may be arranged along or transverse to spanning axis 118 from each other. Alignment apertures 182 may be bounded by contact sites 184 that are linear, as shown here, or convex and/or concave.

[0131] FIG. 35 shows crimping tool 460 mated with fastening member 472, with male jaw 462 and female jaw 464 received in respective alignment apertures 182. Male jaw 462 may have a jaw face defining a protrusion 474 that is aligned, along spanning axis 118, with a recess 476 defined by the jaw face of female jaw 464.

[0132] FIG. 36 shows how jaws 462, 464 can deform crimp region 92 when the jaws apply compressive force, indicated by arrows at 478, to the opposing contact sites of the crimp region. The male jaw may form an indentation 480 in the adjacent contact site of the crimp region. The female jaw may form a protrusion 482 in the adjacent contact site of the crimp region, with protrusion 482 aligned with indentation 480. In some cases, the female jaw also may form one or more indentations 484 in the adjacent contact site of the crimp region.

Example 6

Selected Embodiments

[0133] This example describes selected embodiments of the present disclosure, presented as a series of numbered paragraphs.

[0134] A1. A method of binding bone, the method comprising: (a) selecting a fastening member having a crimp region and defining a window at least partially bounded by a wall region of the fastening member; (b) arranging an encircling member to extend through the crimp region and form a loop around a portion of bone and span the window outside the crimp region between spaced sites of the wall region; and (c) crimping the crimp region to secure at least one end of the loop to the fastening member.

[0135] A2. The method of paragraph A1, further comprising a step of sectioning the encircling member with a cut placed through a portion of the encircling member that spans the window.

[0136] A3. The method of paragraph A2, wherein the step of sectioning the encircling member is performed with a cutting tool disposed in the window.

[0137] A4. The method of paragraph A2, wherein the step of sectioning the encircling member includes a step of cutting the loop after the step of crimping.

[0138] A5. The method of paragraph A2, wherein the step of sectioning the encircling member includes a step of cutting through the encircling member at a position outside the loop.

[0139] A6. The method of paragraph A5, wherein the step of sectioning the encircling member cuts through the encircling member at a first position along the loop and at a second position outside the loop.

[0140] A7. The method of paragraph A1, wherein the step of arranging includes a step of arranging the fastening member such that a top surface region of the fastening member faces away from the portion of bone and a bottom surface region of the fastening member faces toward the portion of bone.

[0141] A8. The method of paragraph A7, wherein the step of arranging includes a step of arranging the encircling member such that both ends of the loop extend through the fastening member on a path intermediate the top and bottom surface regions.